THE PUPA OF *RHAPHIOMIDAS TERMINATUS* CAZIER (DIPTERA: APIOCERIDAE)

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The immature stages and biologies of only two species of Apioceridae are known at present. Both of these belong in the genus *Apiocera* and are only partially complete. For the seacoast-inhabiting Australian *A. maritima*, English (1947) describes and figures the egg, larva and pupa and Cazier (1963) provides photographs and descriptions of the egg and first instar larva of *A. painteri*. In view of the great paucity of knowledge for this family of flies, I deem it appropriate to make known the discovery of the pupa of a species of *Rhaphiomidas*, a genus for which there is no previous published information regarding immatures.

The specimens upon which the following notes, figures and description are based were given to me, and deposited in the entomological collection of the Los Angeles County Museum of Natural History (CLH 154), by Mr. Carl Hall who collected them in his back yard at 664 35th Street, Manhattan Beach, California. Mr. Hall noticed the adult fly, a male, emerging from the pupa which lay on flat, sandy ground near an open cage provided for a pet desert tortoise. The terrain is flat at the location and borders the landward edge of a sand dune separating the property from the ocean, which is approximately three-fifths of a mile to the west. Mr. Hall relates as never before having seen another pupa, larva or adult which could have been an apiocerid in his yard and, therefore, could give no clues regarding the species' breeding habits. The time of the fly's emergence and collection was mid-August, 1965.

Description of the pupal exuviae

The salient characters are shown well in Figures 1 to 3. The following features are worthy of descriptive note:

Size (abdomen slightly curved caudad producing a small error in measurement of length): length 30 mm.; breadth at abdominal segment three, 7 mm.

Integument well sclerotized, texture rugose, color medium brown.

Head armed with four pairs of prominent, heavily sclerotized stout spines: the three anterior pairs fused onto a common protuber-

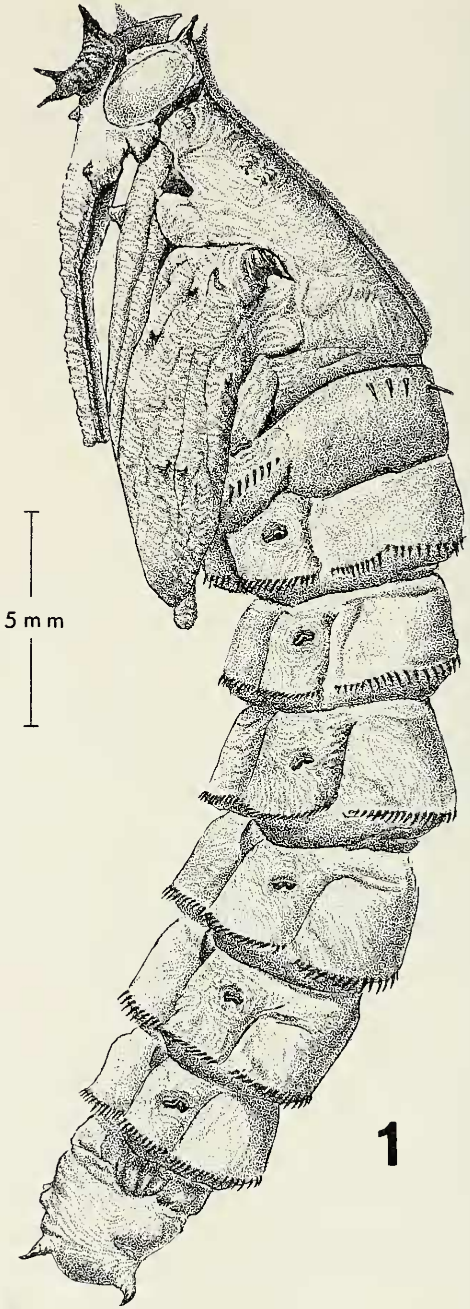
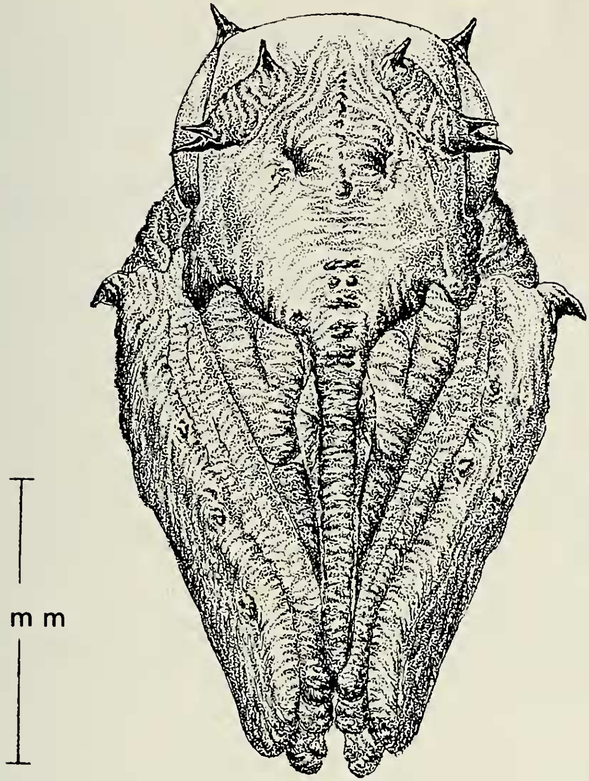


Figure 1. Pupal exuviae of *Rhaphiomidas terminatus.* Lateral view.



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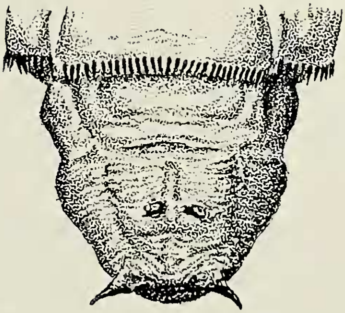

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Figure 2. Cephalic and thoracic portions of pupal exuviae of *Rhaphiomidas terminatus.* Frontal view, positions of leg and mouthpart sheaths reconstructed.

Figure 3. Terminal abdominal segment of pupal exuviae of *Rhaphiomidas terminatus.* Frontal view.

ance situated diagonally on the front of the face between the eyes; the fourth pair single and situated on the vertex between the eyes and directed cephalodorsad. Mouthparts sheaths very long (corresponding to elongate proboscis of adult), nearly extending to the tips of the anterior leg sheaths.

Thorax with prominent caudally directed spine at base of wing sheath. Arrangement, shapes and sizes of leg sheaths as figured (Fig. 1 shows these structures in their actual positions after disarrangement by the emerging adult; in Fig. 2 an attempt has been made to reconstruct this part of the pupal anatomy, returning the disrupted elements to their normal status). Tips of leg sheaths extending between and separating tips of wing sheaths.

Abdomen with eight apparent segments. Each segment except the first and last with prominent rectangular lateral lobe bearing a bilobed spiracle near the center; the anterior-most spiracle displaced cephalad. Segments as above each ringed caudally with a single straight row of subequal, short, sharply pointed, bristle-like spines; the spines of segment 1 absent dorso-laterad and larger than those described above dorsad and laterad.

Terminal abdominal segment apically armed with a quadrant of caudally directed spines; a pair of small tubercles mid-ventrad; bristle-like spines and spiracles absent.

ACKNOWLEDGMENTS

The figures were rendered by Mrs. Evie Templeton, Exhibitions Division, Los Angeles County Museum of Natural History. I wish also to acknowledge the assistance of Dr. Mont Cazier, Arizona State University, for confirming my identification of the specimen.

NOTES ON A SECOND RHAPHIOMIDAS PUPA

Upon learning of the discovery of the *R. terminatus* pupa, Dr. Cazier sent me a pupal case of a second *Rhaphiomidas* species, which he and an assistant (J. M. Davidson) found 2 mi. south of Cronise Dry Lake, San Bernardino Co., California, 3 May 1966. The head case is entirely missing but the remaining structures indicate a species very closely allied to *terminatus*, possibly *acton* Coquillett or *maehleri* Cazier judging from the locality. According to Cazier, "The pupal case was partially covered with sand in an area of mostly sand and mesquite." The specimen is preserved in his collection at Tempe.

LITERATURE CITED

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